GEMPACK USER DOCUMENTATION

Release 7.0

GPD-6

Installing and Using
the Source-Code Version of GEMPACK
on DOS/Windows PCs with Lahey Fortran

Installing and Using the Source-Code Version of GEMPACK on DOS/Windows PCs with Lahey Fortran

GEMPACK Document No. GPD-6

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This is part of the documentation of the GEMPACK Software System for solving large economic models, developed by the IMPACT Project, Monash University, Clayton Vic 3800, Australia.

Abstract

DOS/Windows PC computers provide excellent platforms for doing serious general equilibrium modelling. This document describes how to install and use GEMPACK on a DOS/Windows PC provided it has any one of the Lahey Fortran compilers LF90, LF95 or F77L-EM/32 installed on it.

This document also describes how to install the Windows GEMPACK programs WinGEM, ViewHAR, ViewSOL, RunGEM, TABmate and AnalyseGE, and the electronic versions of the GEMPACK documentation.

Authors and Earlier Editions

Date	*Author(s)*	*Comment*
	[The first two editions of this were numbered GED-29.]	
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CHAPTER 1

1 The DOS/Windows Version of GEMPACK

This document GPD-6 tells you how to install the Source-Code version of GEMPACK on a DOS/Windows PC which runs Windows 95, 98, NT or 2000, and has a Fortran compiler installed. Suitable compilers are the Lahey compilers LF90, LF95 or F77L-EM/32.

This document GPD-6 gives installation instructions about how to:

1. install the software from the GEMPACK CD,
2. run the program which builds the GEMPACK libraries and GEMPACK programs,
3. install the Windows GEMPACK programs (WinGEM, ViewHAR, ViewSOL, RunGEM and TABmate),
4. install the new Windows program AnalyseGE used for analysing simulation results,
5. install electronic versions of the GEMPACK documentation.

GPD-6 also covers machine-specific information relating to working with GEMPACK on a PC.

The user documentation for GEMPACK can be found in the other GEMPACK documents[1], of which GEMPACK document GPD-1 *Introduction to GEMPACK* should be your starting point. You can carry out the installation and testing of GEMPACK on a PC, as described below, without being familiar with GEMPACK. However, if you intend to use GEMPACK for modelling, we recommend you quickly read chapters 1 to 3 in GPD-1 before attempting any modelling on your PC.

An introduction to the different GEMPACK programs can be found in section 1.1 of GPD-1, while a guide to the models supplied with GEMPACK (including the DOS/Windows version) is given in section 1.3 of GPD-1. A guide to the full user documentation for GEMPACK can be found in chapter 5 of GPD-1. Hands-on examples for GEMPACK can be found in GEMPACK document GPD-8.

1.1 Current Release

The current version of GEMPACK is Release 7.0 (October 2000).

[1] References to GEMPACK documents identify the document by GEMPACK Document (GPD) number, rather than by author or date. References are always to the version of the document which is current at the date of issue of the cross-referencing document. The GEMPACK documents referenced are listed in a separate section at the end of the References section of this document. Comments from readers on this or any of the GEMPACK documents, either pointing out errors, inaccuracies, omissions or obscurities, or making other suggestions for improvements, will be welcomed. Please address such comments to one of the authors at the Centre of Policy Studies / Impact Project.

1.2 Contacting the Centre of Policy Studies / Impact Project

For more information about GEMPACK, contact

Professor Ken Pearson
Centre of Policy Studies and Impact Project
Monash University,
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Phone: (03)-9905-5484 or +61-3-9905-5484 from overseas
Fax: (03)-9905-2426 or +61-3-9905-2426 from overseas

Other information can be obtained from the GEMPACK Web site:

http://www.monash.edu.au/policy/gempack.htm

CHAPTER 2

2 System Requirements for Installing GEMPACK

1. A pentium PC, or an 80486 DX machine, or an 80486 SX machine with a maths coprocessor.
2. Windows 95, Windows 98, Windows NT, Windows 2000[2].
3. Hard disk, requiring at least 40 MB free to install and test GEMPACK.
4. At least 16MB bytes of memory (RAM) and at least 32MB of RAM if you are using Windows NT or 2000.
5. A suitable Fortran compiler: the Lahey Fortran 90 compiler LF90, the Fujitsu-Lahey compiler LF95 or the Lahey Fortran 77 compiler F77L-EM/32, referred to as F77L3.

Note that the compiler MUST be installed on your machine BEFORE you install GEMPACK.

Most computers easily satisfy the first four requirements. If you feel uncertain about some of these requirements and wish to check them, see the details in sections 2.1.1, 2.2 and 2.3 below.

2.1.1 Disk space free

You can determine how much disk space is free by:

1. in Windows, right click on the icon for your hard drive in "My Computer" or
2. in a DOS box, entering the DOS command: **dir**
   The number of bytes free is shown on the screen at the end of the output. (1Mb is about a million bytes, so you will need about 40,000,000 bytes free to install, test and use GEMPACK.)

Implementing your own models takes more disk space. As you would expect, the larger the model, the more space you will need.

2.2 Memory required

The amount of extended memory you have limits the size of models you can build. Our experience is that many models that are being built now can be implemented with 16 MB of RAM and most can be implemented in 32MB of RAM (although more is required to implement very large models such as ORANI and its extensions, or large intertemporal models).[3] Windows NT and Windows 2000 need about 16Mb more memory than Windows 95 and 98.

Click on **Help | About** in the main menu of **My Computer**. This will tell you how much physical memory is available to Windows.

---

[2] For Release 7.0, we are no longer supporting installation under Windows 3.1.

[3] The two Lahey Fortran compilers and Phar Lap can use 'virtual memory'. However we have found that the resulting virtual memory programs run too slowly (when they actually need virtual memory) to be useful. Accordingly the GEMPACK executable images produced by the GEMPACK installation process cannot access virtual memory.

2.3 FORTRAN compilers

The Lahey FORTRAN compilers for DOS/Windows PCs are produced by Lahey Computer Systems Inc. Recently Lahey has joined with Fujitsu to produce the compiler LF95.

You need one of the following compilers:

- Lahey Fortran 90 compiler LF90
- Fujitsu/Lahey Fortran compiler LF95
- Lahey Fortran 77 compiler F77L-EM/32 compiler which is called F77L3[4]

If you are using LF90, we recommend LF90 version 4.50 or later[5]. If you have a version of LF90 4.50, we recommend you update to LF90 version 4.50i (or later) by downloading the (free) update from the Lahey Website. Note that you cannot use Essential Lahey Fortran 90 (ELF 90), it must be the full LF90 compiler.

You **can now use** the newer Fujitsu / Lahey Fortran compiler LF95 since this compiler is now supported for use with GEMPACK.[6] We have made the necessary changes to the GEMPACK code to cover changes Fujitsu / Lahey has made to the binary file format in LF95. (See section 2.3.1 for details.)

There are various different grades of Fujitsu/Lahey LF95 compilers available. If you are just using LF95 for GEMPACK, you can use the least expensive one called LF95 Express. If you are developing programs in Fortran as well and need to debug programs, you may wish to buy Standard LF95 or LF95 Pro. [You should have version 5.5 of later of LF95.]

If you are buying a new compiler we recommend LF95. We do not recommend F77L3 since we may not support it in future releases of GEMPACK. This is because the compiler F77L3 satisfies the Fortran 77 standard (1977), and consequently, F77L3 does not have modern facilities available such as allocatable arrays and long filenames that may contain spaces.

If you are currently using F77L3, we recommend that you update to LF95 as soon as you can.

If you are currently using LF90, there is no need to upgrade to LF95.

---

[4] You cannot use either Lahey F77L, Lahey Personal FORTRAN or the discontinued Lahey F77L-EM/16 compilers, and you cannot use versions of F77L3 earlier than version 5.01.

[5] For LF90, you must have version 3.50c or later.

[6] LF95 has difficulties compiling very long (TABLO-generated) programs, and for long programs, uses a large amount of disk space for temporary files. However we have avoided this problem by a new compile and link process (LTG) which divides the Fortran program into smaller pieces, and links them together at the end.

Contact Lahey at	Lahey Computer Systems Inc PO Box 6091 Incline Village, NV 89450, USA Website : http://www.lahey.com Telephones: +1-800-548-4778 or +1-702-831-2500 FAX: +1-702-831-8123
The Australian agent is	Devin Trussell Computer Transition Systems Box 4553, Melbourne 3001 Website: http://www.cts.com.au Email: info@cts.com.au Telephone : (03) 9530-6633 or (613) 9530-6633 (overseas) FAX: (03) 9530-6644 or (613) 9530-6644 (overseas)

2.3.1 Lahey or Fujitsu Files

Binary files (most importantly, Header Array files) produced by F77L3 can be read by LF90 programs and vice versa. We refer to these files as **Lahey** Files. Unfortunately this compatibility does not extend to LF95. We refer to the files produced by LF95 as **Fujitsu** files to distinguish them from Lahey files.

Binary files produced by LF95 programs cannot be read directly by programs compiled and linked using LF90 or F77L3. Similarly, binary files produced by LF90 or F77L3 programs cannot be read directly by programs compiled and linked using LF95.

However

- we supply with GEMPACK tools which allow you to convert binary files of one of these types to the other type.
- GEMPACK programs can read binary files of either type, by converting to the file to a temporary file of the correct type for your compiler.

See chapter 15 of GPD-4 for details.

As an example, suppose you are working with LF95. The GEMPACK installation contains files of both types and will install Fujitsu files appropriate for LF95. Files made by your simulations will be Fujitsu files. However if you receive a Lahey file from someone else who uses the LF90 compiler, GEMPACK programs can read it. Or you can convert it to a Fujitsu file by using the conversion program if you wish to use it extensively.

Note however that GEMPACK programs from Release 6.0 or earlier cannot read Fujitsu files. These files must be converted first to Lahey files, following the procedures described in chapter 15 of GPD-4.

More details about this topic can be found in chapter 15 of GPD-4.

CHAPTER 3

3 Installation Instructions

Source-code GEMPACK is usually supplied on a CD. If you do not have a CD drive on your computer, see chapter 8.

The components to install are:

- the Source-code version of GEMPACK.
  This involves copying the Source-code files from the CD or disks and building libraries and executable images of the various GEMPACK programs.
- the GEMPACK licence file plus any bug fixes
- Windows GEMPACK programs including:
  WinGEM the Windows interface to GEMPACK.
  ViewHAR used to view and modify data on GEMPACK Header Array files.
  ViewSOL used for viewing Solution files (results of simulations).
  GemEdit a text editor used by WinGEM.
  RunGEM used for carrying out simulations with models and doing sensitivity analysis.
  TABmate an editor for modifying and debugging TABLO Input files.
  You can choose to install only some of these programs. However we would recommend that you install all the Windows GEMPACK programs.
- AnalyseGE, the Windows program used for analysing simulation results.
- electronic versions of the GEMPACK user documentation (PDF files).
  You can read or print this GEMPACK documentation using the Adobe Acrobat Reader (which you can also install from the Source-Code CD if it is not already installed on your computer).

After some preliminaries, instructions for installing the Source-code version of GEMPACK are in sections 3.5 to 3.11 below. Instructions for installing WinGEM and associated Windows programs are given in section 3.5.1 below. Instructions for installing the GEMPACK documentation are given in section 3.5.2 below.

3.1 Installing your Fortran Compiler

Before installing GEMPACK, install your Fortran compiler LF90, LF95 or F77L3. Select a typical installation for LF90 or LF95.

For F77L3, you must install the extended memory compiler and the associated DOS Extender Phar Lap. Follow the instructions in your Lahey Fortran compiler manuals. For F77L3, select at least,

- The Compiler and Libraries
- Phar Lap DOS Extender, Linker, and Library Manager

If you change your compiler, for example from F77L3 to LF90 or LF95, you need to reinstall the Source Code files again from the CD or disks. There are some different files used for the different compilers.

3.2 If You Have An Earlier Release of GEMPACK Installed

If you have an earlier release of GEMPACK installed on your machine, when installing Release 7.0, you can either choose to leave the earlier version on the disk or to first remove the earlier version. Indeed, it is probably best (if you have enough disk space) to leave the earlier version on the disk until you have successfully installed and tested Release 7.0 (in case an unexpected problem occurs). This means installing Release 7.0 of GEMPACK in a different directory from the one in which you installed the earlier release.

If you decide to keep the existing version while installing Release 7.0, you can change the name of the directory it is in using *My Computer* or *Windows Explorer*. Alternatively, if you prefer to work under DOS, you can use the RENDIR command if it is available on your PC.

3.3 Installing Under Windows

If you are running Windows 95, Windows 98, Windows NT or 2000, we suggest that you install and build GEMPACK libraries using the Windows installer supplied with the Source-Code CD. This way of installing is described in detail in sections 3.5 to 3.11.

If you are running some other operating system (for example, OS/2) or if you prefer to work at a DOS prompt, please contact Ken Pearson at the Centre of Policy Studies / Impact Project (section 1.2) for instructions.

3.4 If You Are Installing on a Network

If you are installing GEMPACK on a network, please read chapter 7 before proceeding.

In particular, if your Fortran compiler is installed on a network, you should make the changes in points (i) and (ii) in chapter 7 to your AUTOEXEC.BAT file and then reboot your computer before continuing.

You can copy all the files from the GEMPACK Source-code CD onto one machine on the network and use the files so copied to install on other machines (including those without a CD drive) attached to the network. (See section 8.1 for details.)

3.5 Installing from the Source-Code CD

Source-Code GEMPACK is supplied on a CD. Insert the CD into your CD drive. Exit from other Windows programs you may have running on your PC. Then select from the **Start Menu**

Run…

and enter in the RUN box,

e:\install.exe (Replace **e:** by the drive letter for your CD – for example, **f:\install.exe**)

After this just follow the install procedure. If you are not sure, read the information below which gives a few more details.

Selecting What to Install

You are first asked to select which components you wish to install. You can select some or all of

- Source-Code GEMPACK (including executable images)
- Files from GEMPACK licence (and fix) diskette
- Windows GEMPACK files (WinGEM etc)
- GEMPACK documentation (PDF files)
- AnalyseGE files

Click in the check boxes to indicate which you want to install[7]. Then click on **Ok**.

The first option above means copying the Source-code files from the CD and then building libraries and executable images of the various GEMPACK programs.

If you have been provided with a new GEMPACK licence, it will be supplied on a disk (not on the CD). If you have checked the first item above, you should also check the second item above so that your new licence is copied to your computer as part of the installation procedure.

If the letter sent with your CD indicates that there is a bug fix disk included, you should check the first two items above so that these bug fixes are incorporated into the version of GEMPACK you install.

Selecting the GEMPACK directory

Then you are asked to select the folder (another name for "directory") in which to install the relevant components. The default is the directory **C:\GP**. We suggest that you install in this default directory unless you have another version of GEMPACK already there. In that case, perhaps choose directory **C:\GP70**. However you can choose any directory you please[8]. Click on the **Browse** button to choose another directory. Select the directory or type in the name of a new directory. The directory need not exist since the installer will create it for you. Indeed it may be best to choose a directory that does not already exist since, otherwise, the installation procedure may overwrite existing files. Then click on **Ok** . Check carefully that the name of the directory is what you want since the installer is inclined to add \GP to the directory name selected.

---

[7] Disk space needed by the various choices is shown in brackets since the main installer can not estimate the sizes of the files involved.

[8] The compilers LF90 and LF95 can handle long file names and directory names and names containing spaces but the compiler F77L3 can not handle more than the original 8.3 format (8 characters plus a full stop and a 3 character suffix). See sections 4.9 and 4.9.3 in GEMPACK document GPD-1 for details. So for example, if you are using F77L3, do not use a directory which is a subdirectory of "C:\Program Files" since this contains a space and is too long.

Below we refer to this directory, where you are installing GEMPACK, as the **GEMPACK directory**. [Click on **Next** once you have selected the directory.]

Changes to AUTOEXEC.BAT

Then you will be asked if you wish the Install program to make relevant changes to your AUTOEXEC.BAT file. Details about these changes can be found in section 3.9 below. We recommend that you respond **yes** if you are installing Source-Code GEMPACK in a new directory, but recommend that you respond **no** if you are installing Source-Code GEMPACK in the same directory which contained an earlier version of GEMPACK. Under Windows NT or 2000, you may like to do these changes in a different way by changing the Environment page of the System Properties to add the GEMPACK directory to your path and set a new Environment variable GPDIR to point to the GEMPACK directory (see section 3.9.2). Say **no** in this case.

Lahey or Fujitsu Files

If you are installing some of the Windows GEMPACK files or AnalyseGE, you will be asked whether you wish to use files suitable for the LF90 / F77L3 compiler (Lahey files), or whether you want files suitable for the LF95 compiler (Fujitsu files). This choice is necessary due to the new format of binary files that the LF95 compiler uses – see section 2.3.1 for details. If you have the LF95 compiler, answer **no** ; if you have LF90 or F77L3, answer **yes.**

Installing

The Install program then begins to install the components you have selected[9]. These are done in the following order.

- Windows GEMPACK files (WinGEM etc) [if selected]
- AnalyseGE files [if selected]
- GEMPACK documentation (PDF files) [if selected]
- Source-Code GEMPACK (including executable images) [if selected]
- Files from GEMPACK licence (and fix) diskette [if selected]

[This order is chosen because the first three above are installed relatively quickly while installing Source-Code files and building libraries and executable images may take considerably longer.]

Leave the CD in the CD drive until the installation is complete.

3.5.1 Installing WinGEM and Related Windows Programs

Follow the prompts and install the Windows GEMPACK files in your GEMPACK directory. You can choose to install just some of these programs but we would recommend that you install all components

You will be told when the installation of these files starts. It takes the installer only a few seconds to copy the relevant files into the directory you have chosen. The installer also creates icons for the various programs (WinGEM, ViewHAR, ViewSOL, RunGEM, GemEdit and TABmate) on your desktop.

[9] The components are separate installs under the main install program so if you cancel out of one, the main installer will go on to the next in the series.

3.5.2 Installing AnalyseGE

You will be told when the installation of AnalyseGE starts.

We recommend that you install AnalyseGE in your GEMPACK directory (but you can use a different directory if you wish). (Note that the name of the EXE file for AnalyseGE is ANALYSGE.EXE.) The installer will create an icon for it on your desktop.[10]

3.5.3 Installing the GEMPACK Documentation

You will be told when the installation of these files starts. Install them into your GEMPACK directory or some other directory if you like. Again it takes the installer only a few seconds to copy the relevant files into the directory you have chosen. The electronic versions of the GEMPACK documentation installed are so-called **PDF files**.[11] These can be viewed or printed with the **Adobe Acrobat Reader**. The installer asks if you want this Acrobat Reader installed. We recommend that you only say **Install** if you do not have any version of this Reader on your PC (otherwise say **Cancel**).

If you choose to install the Adobe Acrobat Reader, the Adobe installer will be run. The installer may take a minute or so to check your computer before beginning the installation. If the Adobe installer suggests rebooting your computer, we suggest that you say **no** so that you complete the other installations first.

3.5.4 Copying Source-code Files and Building Libraries and Executable Images

You will be told when this part of the installation starts. First the GEMPACK installer **BuildGP** (see section 3.6) is installed onto your PC. Then BuildGP starts running. You direct it to copy the source-code files from the CD and then start building the GEMPACK libraries and executable images of the various GEMPACK programs. To do this, work through sections 3.6 to 3.8 below.

[10] See chapter 2 of GPD-4 for further details about AnalyseGE. See chapter 6 of GPD-8 for examples of how to use AnalyseGE.

[11] PDF is an abbreviation for "Portable Document Format".

3.6 Running BuildGP

The program **BuildGP** is designed to carry out the following tasks:

1. Copy the GEMPACK files from the GEMPACK Source-Code CD or the four Source-code diskettes to the directory on your hard disk where you want to install GEMPACK (often C:\GP).
2. Either make changes to your AUTOEXEC.BAT to add this GEMPACK directory to your path (with your permission) or indicate what changes need to be made.
3. Check your system to see if Fortran is installed, if there is enough disk space, whether the licence is in the correct place, and check the DOS path.
4. Make the GEMPACK libraries by compiling many groups of subroutines.
5. Make the GEMPACK programs (Executable images) by compiling the programs and linking to the libraries.

You need not do all these tasks in one go. If you need to, **you can exit** from BuildGP **and restart** it again later to complete the installation of GEMPACK (see section 3.7.1).

When BuildGP starts to run, it offers you two choices.[12]

- Copy files from the installation CD
- Build libraries and executable images.

Click on the first of these ***Copy files from the installation CD*** and then click on the ***OK*** button. Then continue with section 3.7 below.

3.7 Copying the Files from the Installation CD

Next you are asked which version of Fortran you will use. Either click on one of

- ***F77L3***
- ***LF90***
- ***LF95***

and then click on the ***OK*** button.

Then you are asked to specify in **which directory** you wish to install GEMPACK. The default offered is the target directory selected in installing the program BuildGP in section 3.5. Normally you should accept the default (but you can choose another directory if you wish to). We will refer to this directory as the **GEMPACK directory**.

The installer will ask you to confirm the name of the drive containing the CD. Click ***OK*** (after changing the name of the drive if necessary). BuildGP will copy the files from the CD onto your hard disk[13].

If you checked "Files from GEMPACK licence (and fix) diskette" as one of the components to install (see section 3.5 above), you will now be asked to insert the licence and fix diskette into your floppy disk

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[12] If you are installing from disks, these choices are:
- Copy files from the installation diskettes
- Build libraries and executable images.

[13] If you are installing from the four floppy disks, you will be asked to insert the GEMPACK disk number 1 into your floppy drive. You must also specify the name of this drive (for example, **B:**) if it is not **A:**. Once the disk is inserted, click on ***OK***. BuildGP will copy the files from this disk onto your hard disk. Repeat for the remaining disks 2, 3 and 4.

drive. You will also be asked to indicate the name of the relevant drive (A:, B: etc). The installation procedure will copy your licence file and also make any bug fixes contained on the diskette. [This will probably take a little longer that it took to copy the GEMPACK documentation from the CD.]

This completes the copying of files. Now we suggest that you continue in BuildGP to build the GEMPACK libraries and make executable images of various of the GEMPACK programs (as described in the section 3.8 below). However if you wish to, you can exit from BuildGP at this stage and restart it as described in section 3.7.1 below when you are ready to build the libraries and programs.

3.7.1 If You Need to Restart BuildGP

If you have used BuildGP to copy the files to your hard disk (as in section 3.7), but were not able to complete building the libraries and executable images (see section 3.8 below), you need to restart BuildGP to do that.

Find the program BUILDGP.EXE in the GEMPACK directory in *My Computer* or *Windows Explorer*. Double click on it to start it running.

When BuildGP starts to run, click on the option ***Build libraries and executable images***, and then click on the ***OK*** button. Then proceed as in section 3.8 below.

3.8 Building Libraries and Executable Images

(a) If you have just finished the section 3.7, and are still running BuildGP, check that the compiler and GEMPACK directory are as you expect.

(b) If you have just re-started BuildGP running, after selecting *Build libraries and executable images*,

1. check carefully that the directory containing the source-code GEMPACK files is correct. If not, use the ***Browse*** button to select the directory you want to use.
2. The correct compiler (LF90, LF95 or F77L3) should be selected automatically. [If not, please select the one you wish to use.]

Now (in either case (a) or (b) above), click on the ***Start build*** button. BuildGP will go through the various steps to build libraries and executable images. This will take several minutes (perhaps somewhere between 10 and 30 minutes depending on the speed of your machine). If all goes well, you will eventually see a message saying that the libraries and images have been built successfully. In that case, just click ***OK*** and note the next information before BuildGP exits, and then go on to section 3.9.

3.8.1 If an Error Occurs

If an error occurs during this build process, you will be told the name of the procedure when the error occurred. We suggest that you note this name on paper, then exit from BuildGP.

If possible, an Error log is shown containing the last few lines on the screen before the error occurred. This may give you some idea as to what is happening.

Possible Checks and Actions to try:

1. Check that there is plenty of room on your hard disk.
   [If not, you will need to delete some files to create space.]
2. Then reboot your computer.
3. When it restarts, start BuildGP running.
4. Then indicate that you want to build libraries and images.

5. Check the directory (it should be the one you want - otherwise use ***Browse***).
6. Then select ***Options*** in the BuildGP menu bar and then select ***Continue from previous build*** from under the ***Options*** menu. This should start right into the place where the previous error occurred.
7. If the error does not re-appear, continue with the build. If it reappears, please notify us at the Impact Project. If an Error log has been created, please send it with details of what happened.

Note that the compiler F77L3 can only handle the original 8.3 format for filenames and directory names (up to 8 characters plus a full stop and a 3 character suffix and no spaces), but the compilers LF90 and LF95 can handle long filenames. See sections 4.9 and 4.9.3 in GEMPACK document GPD-1 for details.

There are some checks built into BuildGP which check the amount of **disk space** which is free on the drive you have selected for the GEMPACK directory. You can override these checks if you disagree or you can exit from BuildGP, clear some more disk space and then restart BuildGP to continue the build.

3.9 After A Successful Build, Fix the PATH and GPDIR

For GEMPACK to run easily, you must make sure that the GEMPACK directory (usually C:\GP) is on your DOS path, and that the Environment variable GPDIR is set to the GEMPACK directory.

If you allowed the Source-code installer or BuildGP to make changes to AUTOEXEC.BAT, you just need to **restart your computer** now. This will complete the main part of the installation of GEMPACK. Once your computer restarts, you can go on to go to section 3.11 below.

If you did not allow the Source-code installer or BuildGP (as appropriate) to make changes to AUTOEXEC.BAT, you must make the required changes yourself as described in the next section 3.9.1 or (if you are using Windows NT or 2000) section 3.9.2.

3.9.1 PATH and GPDIR Changes in AUTOEXEC.BAT

If you are using Windows NT or 2000, an alternative method is described in section 3.9.2.

If you prefer to make changes to AUTOEXEC.BAT yourself, AUTOEXEC.BAT is a text file in the directory C:\ of your computer. You must edit it in a text editor.

The important changes to AUTOEXEC.BAT are that

- the directory into which you installed GEMPACK must be on your DOS path.
- if this directory is not C:\GP, the DOS environment variable GPDIR must be set equal to this directory.

Once you have made these changes, you must **restart your computer** before proceeding. Examples of these changes are given in sections 3.9.1.1 and 3.9.2.

3.9.1.1 Example of Changing PATH and GPDIR in AUTOEXEC.BAT

You have installed GEMPACK in a directory on your hard disk. The default directory name for the GEMPACK directory is **C:\GP.** However you may have chosen some other directory name in section 3.5 above. For this example we will assume you have used C:\GP70.

If you have not allowed the installer to make changes to your AUTOEXEC.BAT, you must edit the appropriate file (called AUTOEXEC.BAT in your default directory C:\) which is executed when you turn on your PC. (If you have no such file, create one.) You should add these directories to the PATH line in that file. (Use a text editor, such as the editor EDIT which comes with DOS or GEMEdit the GEMPACK text editor.)

For example, if you find a line

```
PATH = C:\;C:\WINDOWS
```

you should change it to

```
PATH=C:\;C:\WINDOWS;C:\GP70;C:\LF9045\BIN          (if using LF90 Version 4.5)
PATH=C:\;C:\WINDOWS;C:\GP70;C:\LF9556\BIN          (if using LF95 Version 5.6)
PATH=C:\;C:\WINDOWS;C:\GP70;C:\F77L3\BIN           (if using F77L-EM/32)
```

Note that it is important not to include any spaces in these lines.

If you do not find a PATH line, make a new line

```
PATH=C:\GP70;C:\LF9045\BIN                         (if using LF90 Version 4.5)
PATH=C:\GP70;C:\LF9556\BIN                         (if using LF95 Version 5.6)
PATH=C:\GP70;C:\F77L3\BIN                                (if using F77L-EM/32)
```

(If you installed GEMPACK on a disk drive different from C:, specify that one in the PATH line.) Do not leave any spaces in the PATH line.

If you installed the GEMPACK files in directory C:\GP, no other change is required to AUTOEXEC.BAT. But if you installed these files in another directory, you need to add an extra line to AUTOEXEC.BAT. For example, if you installed the GEMPACK files in directory C:\GP70, add the following line:

SET GPDIR=C:\GP70

(Change this appropriately to indicate where you actually installed these files.) Note that it is important not to include any spaces in this line, apart from the one between SET and GPDIR.

3.9.2 PATH and GPDIR for Windows NT or 2000

If you are using Windows NT or 2000, there is an alternative method to change the path and set the Environment variable GPDIR. This has the advantage that you do not need to reboot your computer afterwards. Select ***Start | Settings | Control Panel | System.***

In the System Properties book, select the page marked ***Environment.***

1. Select the *Path* variable and add the GEMPACK directory to it (separated by a semicolon ;). Click on the *Set* button to accept this change. Check that the directory containing the Fortran compiler is also on the PATH. If not, add this directory (for example, C:\LF9045\BIN; for the LF90 compiler.)
2. Set a new Environment variable named GPDIR and give it a value C:\GP (or whatever your GEMPACK directory is called.) Select the *Set* button to accept this change. Click on the *Ok* button to accept these changes to the Environment.

Test these changes by opening a new DOS box and entering "SET". This should show the altered path and the new Environment variable GPDIR.

3.10 Possible Changes to CONFIG.SYS or CONFIG.NT

This section is not relevant if you are using LF90 or LF95. It is not necessary to make any changes to CONFIG.SYS or CONFIG.NT when using LF90 or LF95. This is because they use Winconsole Executable Images. The change to Winconsole EXEs is new for Release 7.0 of GEMPACK[14].

[14] If you have older EXEs made under Release 6.0 or earlier that you still wish to run, you may still need a FILES statement in your CONFIG file.

If you are using F77L3 and are running Windows NT or 2000, this change is critical for GEMPACK to work.

If you are running Windows NT or 2000,

you need to add a *Files* statement to the text file **CONFIG.NT**. [This file is usually in directory C:\WINNT\SYSTEM32] We recommend

FILES = 70

(or higher).

If you are running Windows 95 or 98, it may help to do the following.

Check the file CONFIG.SYS in your default directory C:\. Look for the line

FILES = xx

If necessary, change this (use your text editor) so that the number xx is at least 70. If the line is not present, add

FILES = 70

as appropriate.

If you have more than 64Mb of memory (RAM), see section 6.5.2 for a possible change to CONFIG.SYS or CONFIG.NT.

If you needed to change CONFIG.SYS or CONFIG.NT, you should reboot your computer after making the changes.

3.11 GEMPACK Licence

If your GEMPACK licence file has been sent on a disk (a floppy disk accompanying the CD), a file called LICEN.GEM on your first disk will have been copied to the GEMPACK directory. If you already have the licence on your computer in another directory, please copy the file LICEN.GEM to this current GEMPACK directory.

Please see section 1.2 of GEMPACK document GPD-1 for details about GEMPACK licences for Release 7.0.

Release 7.0 licences are different from Release 6.0 licences but can be used with Release 6.0 programs.

3.12 Applying a GEMPACK Fix

This section is relevant only if the letter sent with your software says that there is a **bug fix disk** included. Usually the separate disk sent with your CD will just contain your GEMPACK licence file LICEN.GEM.

If you are installing from CD, it is safest to apply GEMPACK fixes as part of the normal install process from the GEMPACK Source-Code CD as described in section 3.5. This method means that you install GEMPACK again from the CD and then apply the fix. This ensures that the GEMPACK files are as we expect before the fix is applied.

3.13 Accessing the CoPS Web Pages from the CD

The GEMPACK CD also contains a snapshot, created in October 2000, of the Centre of Policy Studies (CoPS) Web site at Monash University. It is created as a convenience for those who do not have easy or rapid Internet access. Please be aware that the real Web site may well have been updated since this CD was created. The real web address is http://www.monash.edu.au/policy/

To access this snapshot of the web site, you do **not** have to be connected to the Internet. However, you do need a Web Browser, such as Netscape or Internet Explorer. Enter the location:

e:/welcome.htm where "e" is the drive letter of your CD drive.

Links pointing to sites outside the Centre of Policy Studies, and *mailto* links have been preserved, but will only function if you are connected to the Internet.

Self-extracting EXE archives are included for those who do not have a browser or the Acrobat reader. There are 16-bit and 32-bit versions of the Netscape browser in the BROWSERS directory of the CD and of the Acrobat reader in the ACROBAT directory of the CD. In each case copy the EXE to your hard drive and run it to install the program.

Included in the CoPS Web pages are PDF versions of many of the CoPS/Impact Project Working papers which you can read or print out using the Acrobat reader.

3.14 Uninstalling GEMPACK

To uninstall GEMPACK from your computer, carry out the following steps:

1. Delete all the files in the directory containing GEMPACK and its subdirectories. Then remove this directory.
2. Remove the lines in your AUTOEXEC.BAT which add the GEMPACK directory to your path, and remove the SET GPDIR=... statement from AUTOEXEC.BAT.

If you are merely short of disk space and want to preserve the GEMPACK software for later use,

1. you can just delete some of the GEMPACK Executable images from the GEMPACK subdirectory, for example, GEMPIE.EXE, SLTOHT.EXE etc
2. **Don't delete** PKZIP.EXE, PKUNZIP.EXE, GRABSCRN.EXE or BUILDGP.EXE
3. You can also delete the libraries (*.LIB) in the GEMPACK directory and the libraries in subdirectories LIBS and TABLO.
4. If you later want to restore GEMPACK, restart BuildGP as described in section 3.7.1 and rebuild the libraries and executable images.

3.15 Increasing Program Parameters If You are Using F77L3

If you are using F77L3, you may find you need to increase some program parameters in order to fit your model into the storage arrays in the GEMPACK programs provided. See section 6.3.7 below for more details about how to do this. However there is another way to avoid having to increase parameters for some of the utility programs such as SLTOHT and GEMPIE. You can use Fortran 90 versions of these programs downloaded from the GEMPACK Web site.

On the GEMPACK website at *http://www.monash.edu.au/policy/gpf90.htm*

there are Fortran 90 stand-alone Executable Images of some GEMPACK Utility programs:

GEMPIE, SLTOHT, SEEHAR, MODHAR, SUMHAR, CMPHAR, MKHAR, RWHAR, SUMEQ, SEENV.

These programs have Fortran 90 memory management with allocatable arrays. We suggest that you down-load these programs from the Web since their parameters do not need to be increased.

However you still need to increase parameters in the main programs TABLO, GEMSIM and SAGEM as described in section 6.3.7. One of the reasons that we recommend that you upgrade your Fortran to LF90 or LF95 is so that you no longer have to carry out this step.[15]

3.16 Text Editor

When installing and using GEMPACK, you will need to be able to edit text files. This is often best done using a text editor (that is, an editor designed for handling text files exclusively). A text editor EDIT is supplied with DOS or Windows. There are many other text editors available on PC machines.

If you installed WinGEM, you can use its associated text editor **GEMEdit**. The text editor **TABmate** can also be used. It is excellent if you are writing or debugging TABLO Input files. It can also be used for other text files.

Alternatively, you can use a word processor (such as Microsoft Word or WordPerfect) to edit text files; if so, you must be careful to save the resulting file as a text file.

[15] Another reason is that F77L3 does not perform well under Windows NT or 2000.

CHAPTER 4

4 Testing the Installation

In this chapter we suggest that you test the main features of the installation by carrying out a simulation with the Stylized Johansen model. If this simulation does not work, you will need to go back to some of the steps in sections 3.9 and 3.10 above.

4.1 Making a Directory for the Stylized Johansen Model

Start WinGEM running, following the procedure described in section 2.1 of GPD-8. Then prepare a directory for the model SJ (Stylized Johansen) and set the working directory, as described in sections 2.1.2 and 2.1.3 of GPD-8.

4.2 Checking the DOS Path and Access to Your GEMPACK Licence

Before carrying out the test simulations, we suggest that you check that your DOS Path has been set correctly and that GEMPACK programs are able to access your GEMPACK licence.

To do this, select

File | Shell to DOS

from the main WinGEM menu. [That is, click on ***File*** and then click on ***Shell to DOS*** from the menu items which drop down.]

This will start a DOS box running. In that DOS box, type in the commands

**cd **

tablo

If your DOS settings are set correctly, the GEMPACK program TABLO will start to run and it will find your GEMPACK licence. In this case you will be offered lots of options for the program TABLO.

Stop TABLO running by typing **Control-C** (that is, hold down the Control key, which is usually on the left of your keyboard and may be labelled "Ctrl", and, while holding it down, touch the C key). TABLO should stop running (though you may need to type Control-C twice). Now type

exit

which should close the DOS box. You are now ready to carry out the test simulations, so please skip to the next section.

If TABLO does not start running, your DOS Path is not as required. This may mean that you didn't accept the BuildGP's suggestion about changes to your AUTOEXEC.BAT file, or perhaps you haven't yet rebooted your computer since you made these changes. Please check again the steps in section 3.9 and then repeat this part of the testing.

If TABLO started running but reported that it could not access your GEMPACK licence, the error message will tell you which licence file the program was trying to access. Please check that your licence file (it is called LICEN.GEM) is in the directory in which you installed GEMPACK. If the program indicates it is trying to access LICEN.GEM in a directory which is different from the one in which you installed GEMPACK, check the parts of section 3.9 which relate to the DOS environment variable GPDIR. Repeat this testing once you have remedied any problems.

If you are unable to diagnose the problems here, please type

exit

(which will close the DOS box) and then click on WinGEM (which should be at the top of your screen). Select

Options | Generate diagnostic file

Select a directory in which to save the diagnostic file (the file will be called **diagnose.txt**). Then please send (via email or fax) this file (it is a text file) to us at the Impact Project. We will endeavour to assist. Details about how to contact the Impact Project are in section 1.2.

4.3 Simulations to Test GEMPACK and WinGEM

To test that GEMPACK and WinGEM are working correctly, we suggest that you carry out the simulations with Stylized Johansen in Examples 2.1.3, 2.1.4, 2.1.5a and 2.1.5b in section 2.1.8 of GPD-8. These examples carry out the simulation using a TABLO-generated program (see also sections 2.5.5 of GPD-1). You might also like to carry out this same simulation using GEMSIM, following Examples 2.1.6, 2.1.7, 2.1.8a and 2.1.8b of section 2.1.9 of GPD-8. In either case, check that the results of the simulation are as expected (see, for example, section 2.7 of GPD-1). You might also like to carry out Examples 2.1.1 and 2.1.2 in section 2.1.5 of GPD-8.

If any of these tests does not work, re-check the steps in the installation in sections 3.9 and 3.10 above.

CHAPTER 5

5 Hands-On Computing on the PC

In this chapter we give suggestions for hands-on computing which will help you to become familiar with many important features of the use of GEMPACK on the PC. These are based on the models supplied with GEMPACK (see chapter 1 of GPD-8), especially the Stylized Johansen and Miniature ORANI models.

Follow section 5.1 below if you are going to use WinGEM (that is, if you are running Windows or Windows 95). Follow section 5.2 below otherwise.

Note that the files corresponding to the example models sent with GEMPACK are all in the EXAMPLES subdirectory of your GEMPACK directory (usually C:\GP\EXAMPLES). You should be able to carry out simulations with all of these models in 16Mb of memory or (32Mb for Windows NT or 2000).

5.1 Using WinGEM

Detailed suggestions for hands-on computing using WinGEM can be found in chapter 2 “Getting Started with GEMPACK via WinGEM” of GPD-8. This begins with examples based on the Stylized Johansen and goes on to examples based on Miniature ORANI, GTAP, ORANIG and ORANIF.

5.2 Not Using WinGEM

Detailed suggestions for hands-on computing using WinGEM can be found in chapter 3 “Unix/DOS Prompt: Hands-on Computing” of GPD-8. This begins with examples based on the Stylized Johansen and goes on to examples based on Miniature ORANI.

CHAPTER 6

6 Working with GEMPACK on a PC

The following sections contain other information relevant to working with GEMPACK on your PC.

6.1 New Model's Directory Location

We suggest that each new model you build is put in a separate directory on the hard disk, outside of the GEMPACK directory (usually C:\GP). Note that your PATH command will ensure that the GEMPACK programs are found correctly. Conversely if your PATH and GPDIR are not set correctly, the GEMPACK programs will not run.

When you use WinGEM with any model, make sure that you set WinGEM's working directory to point to the directory containing the files for this model (as spelled out in section 2.1.3 of GPD-8).

6.2 For Speed, Use TABLO-generated Programs

You have installed a source-code version of GEMPACK on your PC and have a suitable Fortran compiler, so you will probably prefer to use TABLO-generated programs instead of GEMSIM for simulations. For small models such as Stylized Johansen and Miniature ORANI there is not much difference in speed. But TABLO-generated programs will run faster with large models. [Some CPU times are reported in chapter 4 of GPD-8.]

6.3 Working in a DOS Box

6.3.1 Compiling and Linking TABLO-generated Programs

Wherever your TABLO-generated program is located on the disk, you can compile and link it using the commands LTG. For example to compile and link the program SJ.FOR, the command is

LTG SJ

(don't add the suffix .FOR.)

6.3.2 Fortran 90 TABLO-generated Programs

If you are using LF90, you will notice that TABLO produces a file with suffix .F9M as well as the usual files with suffixes .FOR, .AXS and .AXT when it creates a TABLO-generated program. This .F9M file is required for compiling and linking the TABLO-generated program (similarly to the .FOR file). However this .F9M file is not required for running the TABLO-generated program so if you delete the .FOR file you can also delete this .F9M file.

6.3.3 Running GEMPACK Programs in a DOS box

Under DOS, this is done just by typing in the name of the program, as in, for example,

sagem

Because the GEMPACK directory is on your path, your computer should find SAGEM.EXE in your GEMPACK directory and start it running.

For TABLO-generated programs, change to the directory where the TABLO-generated program is. Type in the name of the program, for example,

sj

to run the program SJ.EXE.

We strongly suggest that you always work in the DOS box that WinGEM provides via the Menu option:

File | Shell to DOS

The settings of this DOS box have been designed to produce good productivity, especially for GEMPACK users who are running long simulations in a DOS box and simultaneously working with other Windows programs (for example, word processing or spreadsheet programs). In particular, programs running “in the background” in these DOS boxes usually receive a reasonable fraction of total CPU time without disrupting the foreground task.

6.3.4 Interrupting Programs

Sometimes you will start a program running and then realise that it is not doing what you intend. You can interrupt the program and return to the DOS prompt by typing **Control-C** (that is, hold down the Control key, which is usually on the left of your keyboard and may be labelled "Ctrl", and, while holding it down, type C). Sometimes you may have to type Control-C twice to achieve this.

6.3.5 Controlling Screen Output

Often screen output goes much too quickly for you to read. You can control it using the

Control-S Control-Q

keystrokes. (For Control-S, hold down the Control key, which is usually on the left of your keyboard and may be labelled "Ctrl", and, while holding it down, type S).

Use Control-S to stop the screen output and Control-Q to start it again. You can repeat these as needed. However, if you get out of step, say by typing two Control-S in a row, you will lose control of the output and have to wait until the program ends; even Control-C (see section 6.3.4 above) will probably fail then.

On some machines the Scroll Lock key works in a similar way. (It first stops screen output, then starts it, then stops it, and so on.)

6.3.6 Using Stored-input Files in a DOS Box

This section does not apply if you are running WinGEM.

You can use Stored-input files under DOS on a PC either via the GEMPACK **sti** option or using redirection of input as in, for example,

gemsim < sjlb.sti

or using the command line **-sti** feature (see section 4.5 of GPD-1), as in, for example,

gemsim -sti sjlb.sti

[The latter may be more robust under Windows NT.]

If you make your own Stored-input files to use via input redirection, it is a good idea to include the line

bat

at the start of these files. This means that, if the program encounters invalid input, it will stop. (See section 4.3 of GPD-1.)

6.3.7 Making Main GEMPACK Programs in a DOS box

In general, executable images of the GEMPACK programs are made as part of the installation of GEMPACK Source code as in section 3.8. However you may wish to remake just one of these programs in a DOS box. [For example, if you have the F77L3 compiler, you may need to increase some program parameter as described in section 6.4.1.]

In a DOS box change to the directory where you installed the GEMPACK programs (usually C:\GP).

c:
cd \gp

Then to make a main program for example ACCUM, enter the command

mkmain accum

This command *mkmain* works with all the main programs except GEMSIM and TABLO, where the appropriate commands are

mkgemsim

mktablo

6.4 Memory Management

The new features of Fortran 90 allow greatly improved memory management as described in Chapter 13 of GPD-3. If you are using the Lahey LF90 compiler or the Fujitsu-Lahey compiler LF95, you should no longer receive messages to increase program parameters. If you are using the F77L3 compiler you may still need to increase parameters.

6.4.1 Increasing (or Decreasing) Program Parameters (F77L3 only)

As indicated in chapter 13 of GPD-3, you may need to increase (or decrease) the size of one or more parameters in a GEMPACK program or a TABLO-generated one.

To do this for a GEMPACK program, change directory to the directory where you installed the main GEMPACK programs (usually C:\GP) and edit the appropriate source file (for example GEMPIE.FOR for GEMPIE). Then, to make the new executable image (.EXE file), use MKMAIN (see section 6.3.7 above) as in, for example,

mkmain gempie

For utility programs (not TABLO, GEMSIM or SAGEM) there is a simpler way to avoid the problem of increasing parameters: **download the Fortran 90 Executable Image** from the GEMPACK Web site. See section 3.15 for details.

For a TABLO-generated program, edit the source (.FOR file) and then use LTG to create the new executable image as in, for example,

ltg sj

(or else pass in the stack size as a second argument if you need to specify the stack size, as explained in section 6.5 below).

For TABLO, the parameter values are held in the Include files in subdirectory TABLO of the GEMPACK directory (usually C:\GP\TABLO). If you are using F77L-EM/32, these Include files

have suffix **.FOR** (for example TABLE1.FOR) while if you are using LF90 these Include files have **no suffix** (for example TABLE1.) You should edit the relevant one. (See section 2.4 of GPD-2) to find in which Include file each parameter is defined.) Then remake TABLO.EXE by changing directory to the main GEMPACK directory (usually C:\GP) and typing in the command **mktablo**.

For GEMSIM, the parameter values are held in the two Include files in subdirectory TABLO of C:\GP. If you are using F77L-EM/32 these files have suffix **.FOR** (for example GSINC.FOR) while if you are using LF90 they have **no suffix** (for example GSINC.). You should edit the relevant one. (See section 13.3.2 of GPD-3 to find in which Include file each parameter is defined.) Then remake GEMSIM.EXE by changing directory to C:\GP and typing in the command **mkgemsim**.

6.4.2 If a Fortran 90 Program Runs Out of Memory

If you are using the Fortran 90 compiler LF90 or LF95, it may happen that the task you are carrying out with any of the programs requires more memory than is available on your computer. If so you will receive a message saying that the program is stopping because it is

unable to allocate sufficient memory.

If this happens, you may be able to free up more memory by closing down any other applications running (for example, word processors), in which case you can then try to rerun the task. Otherwise you need to find some other way of carrying out the task (or buy more memory).

6.5 Advanced Compiler Use

This section contains a collection of sections relating to errors and options for the Lahey compilers on a PC.

6.5.1 Changing The Size of Program Stacks for TABLO-generated Programs

This subsection only applies if you are using the F77L3 compiler.

You may get an error message from the Phar Lap DOS Extender saying that a TABLO-generated program has run out of program stack. In this case you must increase the size of the program stack. The file LTG.BAT which is used to compile and link TABLO-generated programs includes a default stack size following "-St". (To see the current default value, look in this file in directory C:\GP.) You can increase the stack size for TABLO-generated programs by passing you desired stack size to LTG as a second argument.[16] For example

ltg model 800000

produces an executable image of the TABLO-generated program MODEL.FOR and sets the stack size to 800,000 bytes. If, when you use LTG to increase the stack size, your current size isn't large enough, try increasing it again.

You can get a good indication as to how large to make the stack size by looking at the compilation phase. When the main program is compiled (this happens at the start of the LTG command), you will probably see a warning message about the minimum size of the stack in cases where the stack size given by LTG is not large enough.

For more information about stack sizes, see section 2.8.3 of the F77L3 Lahey manual "DOS Extender & Tools".

[16] The LTG2 command used with Release 5.1 to increase stack size is now simply LTG.

6.5.2 Accessing More Than 64Mb of Memory

Your Fortran compiler may not access more than 64MB (megabytes) of memory unless you take special action. If your computer has more than 64MB of physical memory and you are concerned that GEMPACK programs are not able to access more than 64MB, you should insert the following line

DEVICE=C:\WINDOWS\HIMEM.SYS /NUMHANDLES=128

into your CONFIG.SYS (or CONFIG.NT under Windows NT) file. In the above line, the "/NUMHANDLES=128" is the special part which gives access to more than 64MB of memory. The exact path for HIMEM.SYS may be different on your computer. Indeed you may find a line like that above without the NUMHANDLES part; if so, just add the relevant part to that line.

6.5.3 Compiler Options

The compiler options used in the standard installation (as carried out in section 3.8 above) are ones that, in our experience, produce executable images which run as fast as possible. In particular, we have not included the compiler option which checks at run time that array subscripts remain within the expected range.[17] Provided there is no bug in the GEMPACK software, such checking should be unnecessary since GEMPACK software also checks array subscripts.

If you prefer to have the extra security provided by the bounds checking option, and are not concerned about extra run time,[18] you may change the setup on your computer to include this option by following the steps below.

cd \gp

chkfig.bat

This will copy the options in LF90CHK.FIG, LF95CHK.FIG or F77L3CHK.FIG to all relevant .FIG files. To implement the option, you must first rebuild the GEMPACK library file(s) via the program BUILDGP as described in section 3.8.

Note that LTG.BAT uses the same compiler options which are in the relevant .FIG file (LF90.FIG, LF95.FIG or F77L3.FIG) that is present in your GEMPACK directory GPDIR (usually C:\GP).]

If, later, you want to return to the standard (faster running) options, you can do so via the commands

cd \gp

fstfig.bat

and then use BUILDGP to rebuild your library and GEMPACK programs.

6.5.4 Stand-alone Executable Images

This section is now only applicable to F77L3 executable images. In Release 7.0, LF90 and LF95 make Winconsole executable images which are stand-alone. Hence for LF90 or LF95, you do not need to do anything special to make stand-alone EXEs.

---

[17] If you are using F77L-EM/32, this compiler option is denoted by /B ("Check array subscripts and character substring bounds") - see section 2.2.5.2 of the Lahey F77L-EM/32 manual "Programmer's Reference". If you are using LF90 or LF95 this compiler option is denoted by -chk.

[18] In our experience, adding the compiler option to do bounds checking increases the running time of programs by between 20 and 40 per cent.

If you copy an executable image which is not stand-alone from your machine to another machine, the EXE will not run unless that machine has Lahey Fortran and Phar Lap installed. This is because the executable images you have made on your machine (using "mkmain" or "ltg") need to be able to find the Phar Lap run-time system.

It is easy to make stand-alone executable images of the various programs. These stand-alone versions have the Phar Lap run-time system included in them so they will run when copied to any suitable PC. They are not restricted to machines with Lahey Fortran and Phar Lap installed. We describe below how you can make such stand-alone executable images.

However you should note that the GEMPACK programs TABLO, GEMSIM and SAGEM require a GEMPACK licence. Accordingly, under the terms of your GEMPACK licence, you must not copy (or send copies of) executable images of these to machines outside the site which is covered by your GEMPACK licence. [But you are allowed to send copies of the other GEMPACK programs, including TABLO-generated ones, outside of the site covered by your GEMPACK licence. However, you should note that TABLO-generated programs may require an Introductory licence if they are used with a large model - see section 1.2.5 of GPD-1.]

When you copy a stand-alone executable image to a machine which does not have Lahey Fortran or Phar Lap installed on it, you may need to make changes to the CONFIG.SYS file, following the instructions in section 3.10.

6.5.5 Making Stand-alone Executable Images (F77L3 only)

You can make a stand-alone executable image of the GEMPACK programs except for TABLO, GEMSIM and TABLO-generated ones by using the batch file MKMAINS.BAT in C:\GP. For example, to make a stand-alone executable image of GEMPIE, enter the commands

cd \gp
mkmains gempie

To create a stand-alone executable for a TABLO-generated program, use the batch file LTGS.BAT (the "S" means "stand-alone") in C:\GP. For example, to make a stand-alone image of SJ, enter the command

ltgs sj

which produces a stand-alone executable SJ.EXE. To carry out multi-step simulations using this TABLO-generated program on other suitable DOS machines, copy SJ.EXE and its associated Auxiliary Statement and Table files SJ.AXS and SJ.AXT to the other machine. You will also need to copy the data file SJ.DAT and probably suitable GEMPACK Command files or Stored-input files.

You can make a stand-alone executable images of TABLO and GEMSIM by using the batch files MKTABLOS.BAT and MKGMSIMS.BAT respectively in C:\GP. But such images require your GEMPACK licence and must only be used on machines covered by your GEMPACK licence.[19] To make such executable images enter the commands

cd \gp
mktablos (for TABLO)
mkgmsims (for GEMSIM)

[19] You will need to copy your GEMPACK licence LICEN.GEM (usually found in directory C:\GP) to the other machine. If you install the GEMPACK executable images in a directory different from C:\GP, you will need to assign a suitable value for the DOS environment variable GPDIR by inserting a line "SET GPDIR=..." in the AUTOEXEC.BAT file on this machine. [Of course you are only allowed to copy your licence file to machines within the site covered by your GEMPACK licence.]

The resulting files TABLO.EXE and GEMSIM.EXE will run on any suitable DOS machine. To use GEMSIM.EXE on such a machine to carry out multi-step simulations with models, you will also need to copy the GEMSIM Statement and Table files (these have suffixes .GSS and .GST) for the model to the other machine. (These files are produced when you run TABLO and ask it to produce output for GEMSIM.) You will also need to copy any data files and relevant Command or Stored-input files.

The batch files MKMAINS.BAT, LTGS.BAT, MKTABLOS.BAT and MKGMSIMS.BAT differ from the non-S versions MKMAIN.BAT, LTG.BAT, MKTABLO.BAT and MKGEMSIM.BAT by linking in a so-called "stub" which is a version of the Lahey/Phar Lap DOS Extender; see section 1.7 of the Lahey manual "DOS Extender & Tools" for more information.

If your TABLO-generated program is one that requires a large stack (see section 6.5 above), you can pass to stack size to LTGS.BAT to make a stand-alone executable as in, for example,

ltgs model 800000

6.6 DOS Batch Files

If you create DOS batch (.BAT) files for carrying out tasks including running GEMPACK programs, you may like to take advantage of the fact that, if any GEMPACK program ends with a fatal error, it sets the value of the DOS parameter ERRORLEVEL value to 1. You can test for this in .BAT files to stop the batch job early in such a case.

For example, the .BAT file below runs SAGEM and then GEMPIE. If the SAGEM run ends unsuccessfully, the test of ERRORLEVEL after it aborts the batch job and gives a message saying that the job was unsuccessful.

```
REM Beginning of batch file
REM  Run SAGEM
REM Next uses the –sti option (see section 4.5 of GPD-1)
sagem  -sti sag1.sti
REM test ERRORLEVEL to see if this was successful
if errorlevel 1 goto error
REM  Run GEMPIE
gempie -sti gemp1.sti
if errorlevel 1 goto error
echo off
echo BATCH JOB SUCCESSFUL
goto endbat
:error
echo off
echo *** ERROR: BATCH JOB FAILED ***
:endbat
REM End of batch file
```

Provided your GEMPACK programs are made with Release 6.0 or later of GEMPACK, we strongly recommend that you use “-sti” (as above) to run GEMPACK programs in a DOS batch file (rather than using input redirection). We have found “-sti” more robust under Windows NT than input redirection. The same applies to “-log” (rather than output redirection) if you want to generate a LOG file in this way.

CHAPTER 7

7 Installing GEMPACK on a Network

Some organisations have found it desirable to run the DOS/Windows PC source-code version of GEMPACK and the associated Fortran compiler from a network. For example, this can reduce the need for separate copies of the Lahey compiler.

Below are some pointers to using GEMPACK and /or Fortran on a network.

If you have the Lahey Fortran F77L3 or LF90 or LF95 on a network, please note the following.

(i) For F77L3, you must put the statement

```
SET DOSX=-SWAPDIR C:\
```

into your AUTOEXEC.BAT.

(ii) When compiling (eg via LTG), the Fortran compiler needs to know where the relevant Fortran library is to be found. You can avoid having to edit the various .BAT files by having all users set the value of the DOS environment variable **GPFLIB** to point to this directory. For example, if you are using F77L3 and this is installed in directory L:\PACKAGES\F77L3 on your network, then ask each user to put the line

```
SET GPFLIB=L:\PACKAGES\F77L3\LIB
```

in their AUTOEXEC.BAT file.

The person installing GEMPACK (building the libraries and executable images) should add this line to his/her AUTOEXEC.BAT and reboot before running BuildGP (see section 3.6 above).

(iii) If you are using F77L3 (this point is not relevant if you are using LF90 or LF95), having all .EXE files on the network can have some associated problems because of the differing amounts of memory different users have on their desk PC. For example, if you link up a very large version of SAGEM (for 20x20 GTAP) this may require 30Mb to run. While you may have this memory, another user running smaller models may not have and so won't be able to run the program. You can solve this problem by high-memory users having their own local copy of the EXE. [It is easy to modify LTG.BAT or MKMAIN.BAT to produce the EXE locally rather than on the network.]

(iv) Another issue is who has access to the GEMPACK source etc on the network. Only people with access (write access) can increase parameters etc.

7.1 Installing GEMPACK under DOS or in a DOS box

If you need to install GEMPACK under DOS or in a DOS-like box instead of using the Windows installer, please contact the Impact Project for instructions.

CHAPTER 8

8 If You Are Unable to Install from a CD

If you do not have a CD drive on your PC, you may be able to copy the contents of the CD temporarily to your server and access the files on your PC from the server (see section 8.1). If this is not a possibility, you can make floppy disks from the CD (see section 8.2).

8.1 Installing from the Source-Code CD Copied to the Network

If you copy all the files from the GEMPACK Source-code CD onto the network file server, you can use the files so copied to install on other machines (including those without a CD drive) attached to the network.

To do this, use *My Computer* or *Explorer* to copy **all** files in the top directory **e:** and the directories **e:\GPSC** and **e:\ACROBAT** from the GEMPACK Source-code CD to a directory on the network (and appropriate subdirectories).[20] There is no need to copy the files for the CoPS Web pages in directories **e:\FTP**, **e:\HTM** and **e:\BROWSERS**. Then you can run the copied INSTALL.EXE to install GEMPACK on the network or on other machines which have access to the network.[21]

8.2 Making Floppy Disks from the CD

8.2.1 Making GEMPACK Source Code Disks

If your computer does not have a CD drive installed, you can make floppy disks on another computer which does have a CD drive. Then use the instructions in section 8.2.2 to install on the PC or portable computer which does not have a CD drive.

To make floppy disks from the CD, open *My Computer* and look at the CD drive. Look at the folder or directory called GP60SC. It should contain four subdirectories D1, D2, D3 and D4. Copy all of the files in each of these directories to a separate floppy disk labelled clearly disk 1 to disk 4.

Insert the first disk in the computer whch does not have a CD drive.

Then follow the directions in section 8.2.2.

8.2.2 Installing From the Source-Code Floppy Disks

In this section we tell you how to install source-code GEMPACK if the source code of GEMPACK is supplied on diskettes. The GEMPACK installer is called BuildGP. The first step is to transfer BuildGP to your computer.

To start the installation process, insert **GEMPACK Disk 1** in your floppy drive.

Then select from the **Start Menu**,

---

[20] Here we are assuming that your CD is drive e: . [Change as appropriate.]

[21] Suppose, for example, that you have copied all files (including those in all subdirectories) from the CD into directory V:\DATA\INSTALLS. Then you can Run program V:\DATA\INSTALLS\INSTALL.EXE to install GEMPACK.

Run...

and enter in the RUN box,

a:\install.exe (Substitute **B:** instead of **A:** if your floppy drive is B:)

When install.exe starts to run, it will ask you to specify the Target Directory. This is the directory in which you wish to install GEMPACK. The default is the directory **C:\GP**. We suggest that you install in this default directory unless you have another version of GEMPACK already there. In that case, perhaps choose directory **C:\GP70**. However you can choose any directory you please. The directory need not exist since INSTALL will create it for you. Indeed it may be best to choose a directory that does not already exist since, otherwise, the installation procedure may overwrite existing files.

Below we refer to this Target Directory, where you are installing GEMPACK, as the **GEMPACK directory**.

The INSTALL program will copy the program BUILDGP.EXE, the PIF file BUILDGP2.PIF and the program GRABSCRN.EXE into the GEMPACK directory. It will also create an icon for BuildGP in the GEMPACK group.

To start BuildGP you can find the program BUILDGP.EXE in the GEMPACK directory in *My Computer or Explorer*. Double click to start BuildGP.

Now continue as in the sections 3.6, 3.7 and 3.8. [When you follow section 3.7, you will need to insert disks 1 to 4 when requested.]

8.2.3 Installing WinGEM and Associated Windows Programs from Floppy Disks

If you have an LF90 or F77L3 compiler:

To make disks for installing WinGEM and associated Windows programs, return to the computer with the CD drive and look on the GEMPACK CD for the directory called DISKS. It should contain a set of files:

- WININST.EXE, WININST.W02, WININST.W03, WININST.W04, WININST.W05

The files for installing WinGEM and other Windows programs are called WININST.*. Copy each file to a separate floppy disk and label these disks clearly 1 to 5. [The first disk should contain just WININST.EXE and the last should contain just WININST.W05.] Insert the first WININST disk in the computer without a CD drive and enter in the Start Run box

a:\wininst.exe

to start the installation (instead of **a:\install.exe**). You should install all the files in the same directory (the GEMPACK directory) as you installed the Source-code files (see section 8.2.2). Follow the directions in section 3.5.1. [You will be prompted to insert the other disks.]

If you have an LF95 compiler:

In this case the set of disks are called WININS95.EXE, WININS95.W02, ..., WININS95.W07

Carry out the instructions in the previous section with WININS95 replacing WININST. [Here there are 7 disks.]

8.2.4 Installing AnalyseGE from Floppy Disks

If you have an LF90 or F77L3 compiler:

To make disks for installing AnalyseGE, return to the computer with the CD drive and look on the GEMPACK CD for the directory called DISKS. It should contain a set of files:

- ANGEINST.EXE, ANGEINST.W02

The files for installing the AnalyseGE program and associated files are called ANGEINST.*. Copy each file to a separate floppy disk and label these disks clearly 1 to 2. [The first disk should contain just ANGEINST.EXE and the second should contain just ANGEINST.W02.] Insert the first WININST disk in the computer without a CD drive and enter in the Start Run box

a:\angeinst.exe

to start the installation (instead of **a:\install.exe**). You should install all the files in the same directory (the GEMPACK directory) as you installed the Source-code files (see section 8.2.2). Follow the directions in section 3.5.2. [You will be prompted to insert the other disks.]

If you have an LF95 compiler:

In this case the set of disks are called ANGEIN95.EXE, ANGEIN95.W02, ANGEIN95.W03

Carry out the instructions in the previous section with ANGEIN95 replacing ANGEINST. [This time there are 3 disks.]

See section 2.4 of GPD-4 for further details about AnalyseGE. See chapter 6 of GPD-8 for examples of how to use AnalyseGE.

8.2.5 Completing the Installation

You should copy the GEMPACK licence (if you have been given a new one) following the procedures in section 3.11.

Note that the steps in this section do not install the GEMPACK documentation. You can download individual documents from the GEMPACK web site.

Finally you may need to make the changes to AUTOEXEC.BAT and CONFIG.SYS or CONFIG.NT as described in sections 3.9 and 3.10.

REFERENCES

9 GEMPACK DOCUMENTS

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